# SECTION 7

# NATIONAL ENVIRONMENTAL POLICY ACT REVIEW

## 7.1 INTRODUCTION

It is DOE's policy with respect to compliance with National Environmental Policy Act (NEPA) requirements to incorporate NEPA values into documents prepared for Resource Conservation and Recovery Act (RCRA) corrective actions whenever allowed by the RCRA regulatory oversight agency. Hence, with the approval of the DTSC, this chapter provides the required NEPA documentation, which includes a discussion of the proposed RCRA corrective actions at Berkeley Lab and their consequences. Further, when state agencies must comply with a state environmental policy act (in this case, the California Environmental Quality Act or CEQA), it is DOE's policy to reduce duplication between the NEPA and comparable state requirements (pursuant to the Council on Environmental Quality regulation at 40 CFR Section 1506.2(c)). Therefore, to the extent possible, this NEPA values review incorporates by reference the relevant information contained in the California Environmental Protection Agency Department of Toxic Substances Control's (DTSC's) Initial Study and Tiered Negative Declaration (IS/ND) for the Corrective Measures Project at Lawrence Berkeley National Laboratory (DTSC, 2005).

The IS/ND was prepared by the DTSC in accordance with requirements of CEQA (Section 21000 et seq., California Public Resources Code) and Guidelines for Implementation (Section 15000 et seq., Title 14, California Code of Regulations). The IS/ND describes the environment affected by the proposed actions and analyzes the potential impacts with regard to the following environmental topic areas: (1) aesthetics; (2) agricultural resources; (3) air quality; (4) biological resources; (5) cultural resources; (6) geology and soils; (7) hazards and hazardous materials; (8) hydrology and water quality; (9) land use and planning; (10) mineral resources; (11) noise; (12) population and housing; (13) public services; (14) recreation; (15) transportation and traffic; (16) utilities and service systems; and (17) cumulative impacts. The document was tiered from Berkeley Lab's 1987 Long Range Development

Plan Environmental Impact Report (1987 LRDP EIR), as amended in 1992 and 1997 (Berkeley Lab, 1987, 1992, 1997).

The IS/ND is being published concurrently with this CMS Report and is available for public review and comment. The IS/ND, along with programmatic tiering documents, is available for review at the following location:

Berkeley Public Library
2nd floor Reference Desk
2090 Kittredge Street
Berkeley, California.

In addition, the IS/ND is available for review on-line at:
http://www.dtsc.ca.gov/HazardousWaste/LBNL/index.html

The following sections briefly describe the purpose and need of the proposed action, alternatives considered, the affected environment, and the potential impacts of the proposed action. More detailed descriptions of the affected environment and potential impacts are contained in the IS/ND. More detailed discussions of the proposed RCRA corrective actions are provided in previous sections of this CMS Report.

## 7.2 PURPOSE AND NEED

The purpose of the proposed action is to implement (construct or complete) the corrective measures (clean-up activities) recommended in the CMS Report. These activities would be implemented to reduce or eliminate the potentially adverse effects to human health or the environment caused by historic releases of chemicals to soil and groundwater at Berkeley Lab, and would be conducted as part of the Corrective Measures Implementation (CMI) phase of the project. A NEPA review of this proposed action is required because in addition to extending the corrective measures that are currently in place, the CMI phase of the project will implement additional corrective measures.

## 7.3 PROPOSED ACTION AND ALTERNATIVES

Berkeley Lab has identified, evaluated, and recommended clean-up measures in accordance with requirements of the RCRA Corrective Action Process. This process is

described in detail in Section 3 and Section 4 of this report. The first step in the process consisted of compiling a list of alternatives potentially applicable to clean-up of volatile organic compound (VOC) contaminated soil and groundwater at Berkeley Lab. The categories of alternatives and the specific technologies identified are listed in Table 7.3-1 and Table 7.3-2 for areas of VOC-contaminated soil and groundwater, respectively.

**Table 7.3-1. Potentially Applicable Cleanup Alternatives for VOC-Contaminated Soil**

| Corrective Measures Category | Technology |
|---|---|
| No Action | No Action [1] |
| Monitored Natural Attenuation (MNA) | Monitored Natural Attenuation (MNA) |
| Risk and Hazard Management | Institutional Controls (physical barriers or markers)<br>Institutional Controls (legal or administrative) |
| Containment | Capping, Solidification, Stabilization |
| In situ treatment | Enhanced bioremediation<br>Phytoremediation<br>Bioventing<br>Chemical oxidation<br>Electrokinetic separation |
| Extraction with ex situ treatment | Soil vapor extraction (SVE)<br>Thermally enhanced SVE/dual phase extraction<br>Fracturing, enhanced SVE<br>Soil flushing (water/ surfactant/co-solvent) with groundwater extraction<br>Soil mixing<br>Excavation with *ex situ* treatment: Biopiles, composting, fungal biodegradation, chemical extraction, chemical oxidation/reduction, dehalogenation, separation, soil washing, hot gas decontamination, incineration, open burn, pyrolysis, and thermal desorption.<br>Excavation and off-site disposal |

[1] Under the No Action alternative, all previously implemented Interim Corrective Measures (ICMs) and pilot tests would be terminated, and no additional active measures would be implemented.

**Table 7.3-2. Potentially Applicable Cleanup Alternatives for VOC-Contaminated Groundwater**

| Corrective Measures Category | Technology |
|---|---|
| No Action | No Action[1] |
| Monitored Natural Attenuation (MNA) | Monitored Natural Attenuation (MNA) |
| Risk and Hazard Management | Institutional Controls (physical barriers or markers)<br>Institutional Controls (legal or administrative) |
| Containment and Capture | Containment/diversion (Slurry walls, Sheet pile walls, Grout curtains)<br>Groundwater Capture (Drains, Trenches, Extraction wells) |
| In situ treatment | Permeable Reactive Barrier (PRB) and Funnel and Gate<br>Chemical Oxidation<br>Enhanced bioremediation<br>Phytoremediation |
| Extraction with ex-situ treatment | Soil Flushing with Groundwater Extraction<br>Dual-Phase Extraction (DPE)<br>Air Sparging<br>In-Well Air Stripping<br>Steam/hot water Injection |

[1] Under the No Action alternative, all previously implemented Interim Corrective Measures (ICM) and pilot tests would be terminated, and no additional active measures would be implemented.

The potentially applicable clean-up alternatives listed in Table 7.3-1 and Table 7.3-2 were screened to eliminate those alternatives that were considered ineffective or not applicable under site-specific conditions. Based on the screening process, the following technologies were retained for the site-specific evaluations applied to each of the areas of soil and groundwater contamination.

**Soil**

- No Action
- Institutional Controls
- Containment (Capping, Solidification, Stabilization)
- In Situ Chemical Oxidation
- Soil Vapor Extraction (SVE) or Dual Phase Extraction (DPE)
- Thermally Enhanced SVE/DPE
- In Situ Soil Flushing (with water)
- Soil Mixing
- Excavation with offsite disposal

**Groundwater**

- No Action
- Monitored Natural Attenuation (MNA)
- Institutional Controls
- Containment (slurry walls, sheet pile walls, grout curtains)
- Groundwater capture (drains, trenches, extraction wells)
- Permeable Reactive Barrier and Funnel and Gate
- Chemical Oxidation
- Enhanced Bioremediation
- Groundwater Extraction/Flushing
- Dual-Phase (groundwater and soil-vapor) Extraction

The retained alternatives were subjected to a formal evaluation process for each area of soil and groundwater contamination where further action was required. The process considered whether the alternative would comply with the following four standards:

- Protect human health and the environment
- Attain the required clean-up levels
- Control sources of releases to reduce or eliminate, to the maximum extent practicable further releases that might pose a threat to human health or the environment
- Meet all applicable waste management requirements

In addition, the alternatives were evaluated against the following five selection factors:

- Long-term reliability and effectiveness
- Reduction in the toxicity, mobility, or volume of waste
- Short-term effectiveness
- Implementability, including consideration of site-specific factors as well as community and state acceptance
- Cost

The clean-up alternative(s) that best met the four standards and five selection factors listed above for each area of soil or groundwater contamination were recommended for implementation. The recommended alternatives were as follows:

**Soil**

- Excavation with offsite disposal

**Groundwater**

- Monitored Natural Attenuation (MNA)
- Institutional Controls
- Groundwater capture (drains, trenches, extraction wells)
- Enhanced Bioremediation
- Groundwater Extraction/Flushing
- Dual-Phase (groundwater and soil-vapor) Extraction

As noted in the preceding chapters of this CMS Report, corrective measures are required for two areas of soil contamination and seven areas of groundwater contamination. A specific clean-up technology/technologies is recommended for each of these areas on a media- (groundwater or soil) and site-specific basis. The technology recommended for soil clean-up is excavation and off-site disposal of contaminated soil. The primary technologies recommended for groundwater clean-up are in situ soil flushing and monitored natural attenuation (MNA). Localized application of chemical oxidants and Hydrogen Release Compounds® (HRC®) is also proposed.

Excavation and off-site disposal are recommended for the cleanup of contaminated soil near Buildings 7 and 51L. Contaminated soil in these areas would be excavated and placed in covered storage bins until the bins could be shipped off site for disposal in accordance with applicable local, state, and federal laws and regulations.

Soil flushing and/or MNA are recommended for the cleanup of contaminated groundwater near Buildings 51/64, 51L, 69A, and 71B, and in the "Old Town Area" near Buildings 7, 25A, and 52. Soil flushing consists of the simultaneous injection of clean water into, and extraction of contaminated water from, the subsurface. The purpose of soil flushing is to promote flow of contaminated groundwater towards extraction locations (e.g., wells or trenches) and to increase the rate that residual soil contaminants desorb into the flowing groundwater. The extracted groundwater would be treated on site using granular activated carbon (GAC) canisters, and then reinjected to continually flush contaminants from the subsurface or, if the water is not needed for flushing, discharged to the sanitary sewer under a permit issued by the East Bay Municipal Utility District (EBMUD).

The initial construction or installation phases for most of the soil flushing systems have already been completed as part of pilot tests or Interim Corrective Measures (ICMs) conducted

over the past few years. The corrective measures in most cases consist of adoption or expansion of these pilot tests and ICMs. MNA would be applied in areas where hydrochemical data indicate that natural processes (e.g., biodegradation) are reducing the mass of contaminants, and consists of continued monitoring of the effectiveness of these processes.

## 7.4 AFFECTED ENVIRONMENT

The affected environment for each NEPA value (air quality, biological resources, geology, soils, etc.) is described below. No Agricultural Resources or Mineral Resources are known to occur on the site. Therefore, these two values have been excluded from further review.

### Aesthetics

Berkeley Lab has an aesthetic that is sometimes described as "buildings in nature" as site structures are, for the most part, scattered amid trees and other vegetation. Although Berkeley Lab manages on-site vegetation to reduce the risk of wildland fire, vegetated areas are typically dense enough to visually separate the built environment from adjacent residential properties and to serve as a transitional element between the Lab and the parklands and open space to the east. Many buildings in the central built area display an industrial look and utilitarian quality due to the type of building materials (e.g., poured-in-place concrete, corrugated metal siding) and the visible mechanical equipment (exposed pipes, vents, panels, and tanks) related to the activities occurring in the buildings. Activities associated with the implementation of corrective measures would occur within the central built environment of Berkeley Lab (e.g., in parking lots and/or adjacent to buildings).

### Air Quality

The site is located in the cities of Berkeley and Oakland, within the boundaries of the San Francisco Bay Area Air Basin. Berkeley's proximity to the onshore breezes stimulated by the Pacific Ocean provide for generally very good air quality at Berkeley Lab. However, during the summer and fall emissions generated in Oakland and Berkeley are often blown to the east and south, where they contribute to the formation of photochemical smog. In the winter, reduced solar energy and cooler temperatures diminish ozone smog formation, but increase the likelihood of carbon monoxide formation.

The federal Clean Air Act of 1970 established maximum allowable concentration criteria standards for six ambient air pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. Each of these standards was set to meet specific public health and welfare criteria. California has adopted more stringent state standards for these and other pollutants. These ambient air pollutants and their state and federal standards are listed in Table 7.4-1.

The Bay Area Air Basin is currently designated as nonattainment for state and federal ozone standards, although ozone levels measured in the Berkeley and Oakland area have not exceeded the standards in the past four years. Ozone and ozone precursors are the pollutants of greatest concern in the Air Basin. The Air Basin is also designated as nonattainment for the state Respirable Particulate Matter ($PM_{10}$) standard. The Air Basin is designated as either attainment or unclassified for all other pollutants.

State law requires that air districts create an inventory of facilities with potential to emit specified Toxic Air Contaminants (TAC), and make this information available to the public upon request. In 2000, the local air district calculated that the annual excess cancer risk in the Bay Area is about 167 per million people from stationary sources, and about 450 in a million from diesel exhaust. Thus, diesel emissions create about 70% of toxic and cancer-causing emissions found in ambient air.

**Biological Resources**

Berkeley Lab is situated on approximately 200 acres on the western slopes of the Oakland-Berkeley Hills, within a mixture of low to moderate density residential neighborhoods and open space of various vegetation types and wildlife habitats. The proposed action would be implemented within developed areas of Berkeley Lab that are generally paved or occupied by other infrastructure and do not provide wildlife resources. No mature trees or water bodies are present in the areas where actions would be taken.

Berkeley Lab is located within the Briones Valley and Richmond USGS (United States Geological Survey) 7.5 Minute Quads. Potential special status species listed by the California Department of Fish and Game Natural Diversity database (CNDDB), U.S. Fish and Wildlife Service (USFWS), and the California Native Plant Society (CNPS) for these Quads are tabulated

**Table 7.4-1. Federal and State Ambient Air Quality Standards**

| Pollutant | Averaging Time | California Standards | Federal Standards | |
|---|---|---|---|---|
| | | Concentration | Primary | Secondary |
| Ozone ($O_3$) | 1 Hour | 0.09 ppm (180 μg/$m^3$) | 0.12 ppm (235 μg/$m^3$) | Same as Primary Standard |
| | 8 Hour | --- | 0.08 ppm (157 μg/$m^3$) | |
| Respirable Particulate Matter ($PM_{10}$) | 24 Hour | 50 μg/$m^3$ | 150 μg/$m^3$ | Same as Primary Standard |
| | Annual Arithmetic Mean | 20 μg/$m^3$ | 50 μg/$m^3$ | |
| Fine Particulate Matter ($PM_{2.5}$) | 24 Hour | No Separate State Standard | 65 μg/$m^3$ | Same as Primary Standard |
| | Annual Arithmetic Mean | 12 μg/$m^3$ | 15 μg/$m^3$ | |
| Carbon Monoxide (CO) | 8 Hour | 9.0 ppm (10 mg/$m^3$) | 9.0 ppm (10 mg/$m^3$) | --- |
| | 1 Hour | 20 ppm (23 mg/$m^3$) | 35 ppm (40 mg/$m^3$) | |
| | 8 Hour (Lake Tahoe) | 6 ppm (7 mg/$m^3$) | --- | |
| Nitrogen Dioxide ($NO_2$) | Annual Arithmetic Mean | --- | 0.053 ppm(100 μg/$m^3$) | Same as Primary Standard |
| | 1 Hour | 0.25 ppm (470 μg/$m^3$) | --- | |
| Lead | 30 Day Average | 1.5 μg/$m^3$ | --- | --- |
| | Calendar Quarter | --- | 1.5 μg/$m^3$ | Same as Primary Standard |
| Sulfur Dioxide ($SO_2$) | Annual Arithmetic Mean | --- | 0.030 ppm (80 μg/$m^3$) | --- |
| | 24 Hour | 0.04 ppm (105 μg/$m^3$) | 0.14 ppm (365 μg/$m^3$) | --- |
| | 3 Hour | --- | --- | 0.5 ppm (1300 μg/$m^3$) |
| | 1 Hour | 0.25 ppm (655 μg/$m^3$) | --- | --- |

Source: California Air Resources Board, July 2003

ppm=parts per million
mg/$m^3$=milligrams per cubic meter
μg/$m^3$=micrograms per cubic meter

in the IS/ND (DTSC, 2005). The Quads contain many habitats (from salt marshes to upland oak woodland), only a few of which occur in the less disturbed areas of Berkeley Lab. No action is proposed in these less disturbed areas of Berkeley Lab. In addition, no state or federally listed rare, threatened or endangered plant or animal species have been located or are expected to appear on the site, based on biological surveys conducted previously for the LRDP EIR, as amended in 1992 and 1997 (Berkeley Lab, 1987, 1992, 1997).

State and federal laws related to biological resources that are potentially relevant to the site include the Federal Endangered Species Act of 1973 (ESA), the Migratory Bird Treaty Act of 1918, the California Endangered Species Act (CESA) and the California Native Plant Protection Act of 1977. The U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) enforce the provisions of the ESA and Migratory Bird Treaty Act. The California Department of Fish and Game is responsible for the enforcement of the state laws.

State and federal laws related to biological resources that are potentially relevant to the site include the Federal Endangered Species Act of 1973 (ESA), the Migratory Bird Treaty Act of 1918, the California Endangered Species Act (CESA) and the California Native Plant Protection Act of 1977. The U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration enforce the provisions of the ESA and Migratory Bird Treaty Act. The California Department of Fish and Game is responsible for the enforcement of the state laws.

**Cultural Resources**

An archaeological resources survey conducted for the LRDP EIR found no indications of historic or prehistoric archaeological resources at Berkeley Lab. A team is systematically investigating and reporting on the historic value of all buildings and structures at the Lab. Their reports are submitted to the State Historic Preservation Officer for concurrence. The State Historic Preservation Officer is responsible for administrating federally and state mandated historic preservation programs in California, including Section 106 of the National Historic Preservation Act. Thus far, only Building 51 is considered eligible for listing in the National Register of Historic Places.

## Geology and Soils

Berkeley Lab is located in a region of seismic activity caused by the San Andreas Fault System. The United States Geological Survey (USGS) estimates a 70 percent likelihood of a Richter magnitude 6.7 or greater earthquake in the Bay Area within the next 30 years. Groundshaking from such an earthquake can cause landslides, surface rupture, structural damage, and other ground failures. Within the San Andreas fault system, the active Hayward fault is located within a mile of Berkeley Lab. A major earthquake on the Hayward fault could cause violent groundshaking at Berkeley Lab.

Native soils at Berkeley Lab are typically loams or silty loams with a moderate permeability and a low shrink-swell potential. Natural rock outcrops are few, although there are many rock exposures in cut slopes. At least one major and several minor historical landslide masses are present at Berkeley Lab.

## Hazards and Hazardous Materials

Berkeley Lab's Environment, Health and Safety Division's Waste Management Group is responsible for ensuring compliance with hazardous waste regulations and for determining the Berkeley Lab Hazardous Waste Handling Facility's storage and labeling requirements, selecting an offsite disposal site, and manifesting and maintaining disposal records. Hazardous wastes are handled, stored, and disposed of in accordance with applicable DOE and Berkeley Lab policies, and state and federal regulations.

## Hydrology and Water Quality

Berkeley Lab is located in the Strawberry Creek watershed, an area characterized by steep slopes underlain by bedrock with a shallow soil surface. Groundwater flow through bedrock is typically characterized by fracture flow that has slow recharge and low yield, while groundwater flow in the drainages is unconfined flow and fluctuates with seasonal precipitation. Berkeley Lab is not underlain by an easily accessible, high-yield, confined aquifer system that is capable of supplying many users; however, some minor recharge to the alluvial aquifer underlying the East Bay Plain may occur. There are no production wells at Berkeley Lab or

downgradient of the facility in the City of Berkeley. The Berkeley Lab and surrounding communities receive their water from EBMUD.

Storm water generated within the Berkeley Lab facility is currently managed in accordance with Berkeley Lab's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activity. The San Francisco Bay Regional Water Quality Control Board (RWQCB) and the City of Berkeley provide oversight and enforcement of this permit. Implementation of the permit requirements is detailed in Berkeley Lab's Storm Water Pollution Prevention Plan (SWPPP) and Storm Water Monitoring Plan (SWMP).

**Land Use and Planning**

The corrective measures will be implemented within the Berkeley Lab site, which is owned by the University of California (UC) and mostly leased to DOE. This land and a larger surrounding area belonging to the University are within the boundaries of the cities of Berkeley and Oakland. Adjacent land use includes residential areas to the north, UC Berkeley athletic fields and recreational facilities to the south, residential areas and UC Berkeley student housing, amphitheater, and classrooms to the west, and the UC Berkeley Lawrence Hall of Science Museum to the east.

Berkeley Lab is a federal facility conducting work within the University of California's mission and as such is generally exempted by the federal and state constitutions from compliance with local land use regulations, including general plans and zoning. However, Berkeley Lab seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. The City of Berkeley's Zoning Code designates the entire Berkeley Lab Hill site as High Density Residential. As the purpose of Berkeley Lab is research rather than residential use, this designation does not accurately reflect the existing land uses on the site. The Berkeley General Plan designates the area as Institutional, which correctly reflects the existing uses on the site. Areas adjacent to Berkeley Lab are designated as open space.

The Land Use and Transportation Element of the Oakland General Plan designates land use at Berkeley Lab as Institutional. A portion of Berkeley Lab is also designated as a Resource

Conservation Area, where future buildings are not permitted except as required to facilitate the maintenance of conservation areas.

## Noise

The topography in the Berkeley Lab area is hilly, which has a substantial effect on the propagation of noise. Noise-sensitive land uses exist to the north, east, and west of Berkeley Lab. There are no sensitive land uses in the southerly direction that are close enough to be potentially impacted by excavation or drilling noise. The nearest noise sensitive land use areas are shown on **Figure 7-1**. A description of each area is provided below:

**Area 1** – This area to the west consists of the Nyingma Institute (Buddhist facility) and single- and multi-family residences. The average background sound levels in this area were measured at 44 to 54 dBA.

**Area 2** – This area to the north consists of single-family residences along Campus Drive, Olympus Avenue, and Summit Road. Average background sound levels in this area were measured at 52 to 54 dBA.

**Area 3** – To the east is the UC Berkeley Lawrence Hall of Science Museum. Average background sound levels at the Museum site were measured at 53 to 54 dBA.

## Population and Housing

Berkeley Lab currently has 4,375 employees, which is over 90% of what the 1987 LRDP anticipated at buildout. Employees live in various parts of the Bay Area and commute to work. No housing is located on site.

## Public Services and Recreation

Fire protection is provided on site by the Alameda County Fire Department. The station is located at Berkeley Lab Building 48 and staffed 24 hours per day. At least four firefighters, including officers, are on duty at all times. Equipment includes one fire engine, one reserve fire engine, a hazardous materials vehicle, and a light duty four-wheel drive "brush rig" that can be used for wildland fires.

Security services at Berkeley Lab include contract, non-sworn security officers and sworn police provided by UC Berkeley. Contracted personnel staff the Berkeley Lab entry gate kiosks.

The Berkeley and Oakland Unified School Districts serve the cities that adjoin Berkeley Lab. They operate approximately 100 schools with enrollments totaling about 60,000 elementary and secondary students for the 2002-2003 academic year. The UC Berkeley campus is adjacent to Berkeley Lab.

Berkeley Lab's open space is not accessible to the public. The cities of Berkeley and Oakland have numerous parks. Near Berkeley Lab, regional open space resources include the 2,077-acre Tilden Park and the 205-acre Claremont Canyon Preserve, which border the eastern Berkeley City limits and are used extensively by Berkeley residents. These parks provide open space and recreation facilities, including picnic areas, bicycle trails, swim areas, and environmental education centers. Also bordering the city's eastern limits is University of California property, including the central campus, Strawberry Canyon and the Ecological Study Area that serve as popular open space resources.

**Transportation and Traffic**

Commuter routes serving the Lab and the much larger University are often congested during commute hours. The roadways within or near the Berkeley Lab site that might be affected by corrective measures activities include:

- *Cyclotron Road*, *McMillan Road*, and *Lawrence Road*, which are located within the boundaries of Berkeley Lab.

- *Hearst Avenue,* an east-west street that extends from West Berkeley to the Northwest corner of the UC Berkeley Core Campus near the entrance to Berkeley Lab. Hearst Avenue is not a designated truck route within the City of Berkeley. The intersections of Hearst Avenue near Berkeley Lab operate at acceptable levels of traffic service during both morning and afternoon peak hours.

- *Shattuck Avenue,* a north-south roadway, classified as a Principal Arterial in the Metropolitan Transportation System and the Congestion Management Program. Shattuck Avenue is the most heavily used north-south roadway in the Berkeley area. Shattuck Avenue is a designated truck route between Adeline Street and Shattuck Place. The intersections of Shattuck Avenue with Hearst Avenue and University Avenue operate at acceptable levels of traffic service during both the morning and afternoon peak hours.

- *University Avenue,* a four lane east-west street, classified as a Principal Arterial in the MTS and CMP. The intersections of University Avenue with Martin Luther King Way, Milvia Street, Shattuck Avenue (East), Shattuck Avenue (West), and Oxford

Street are operating at acceptable levels of traffic service during both the morning and afternoon peak hours; however, the intersections of University Avenue with Sixth Street and San Pablo Avenue operate at unacceptable levels of traffic service during both the morning and afternoon peak hours.

- *Interstate 80 (I-80),* which connects the San Francisco Bay Area with the Sacramento region and continues east. Interstate 80 and the nearby I-80/I-580 interchange operate at capacity during peak commute hours. I-80 operates at unacceptable levels of traffic service during both the morning and afternoon peak hours westbound between University Avenue and the I-80/580 split and eastbound from the Emeryville city limits to the Albany city limits.

Berkeley Lab is served by the Bay Area Rapid Transit (BART), Alameda-Contra Costa Transit (AC Transit) bus routes, and a Berkeley Lab operated shuttle service, which includes service to Berkeley Lab.

The BART station closest to the Berkeley Lab is the Downtown Berkeley station at Center Street/Shattuck Avenue. AC Transit provides relatively direct travel to and from neighboring cities such as Oakland, Richmond, El Cerrito, San Francisco, and local Berkeley neighborhoods. A Berkeley Lab shuttle bus operates between the Downtown Berkeley BART station and the Laboratory. Another shuttle bus operates between the Laboratory and the Rockridge BART station during morning and evening commute hours. On-site shuttle bus service is provided.

Bicycle and pedestrian routes can be found on or along most roadways within and surrounding the Berkeley campus.

**Utilities and Services Systems**

EBMUD provides water to Berkeley Lab and has a storage capacity of 3.1 million gallons in the area, which is available in part to serve the Lab. Water is used for both daily laboratory work and facility operations as well as for fire protection. In addition, Berkeley Lab operates and maintains three 200,000-gallon storage tanks on site for emergency supplies.

Wastewater services are provided by EBMUD. Wastewater is carried by a gravity flow system through two monitoring stations at Hearst Avenue and Centennial Drive, which connect to the UC and City of Berkeley sewer systems, ending at the EBMUD intercepting sewer.

Berkeley Lab also has a storm drainage system that empties into North Fork Strawberry Creek and Strawberry Creek.

Non-hazardous solid waste is disposed at the West Contra Costa Landfill in Richmond. The landfill is projected to close in January 2006, at which time solid waste would be disposed at the Altamont Landfill.

Electricity is provided by Pacific Gas and Electric Company through existing on-site infrastructure and the Grizzly Peak substation. Many facilities with Berkeley Lab also have emergency generators for emergency back-up and on-site utility plants.

**Environmental Justice**

Environmental justice was an area not analyzed in the IS/ND. Environmental justice refers to the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws and policies. Analysis of the impacts associated with environmental justice is required under NEPA pursuant to Executive Order (EO) 12898. No specific low-income or minority population as defined under EO 12898 is present in the census tract that includes Berkeley Lab or in adjacent census tracts although commuter and truck traffic will pass through or near minority/low income neighborhoods.

## 7.5 PROBABLE ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

The probable environmental impacts that would result from implementation of the proposed corrective measures are summarized in Table 7.5-1. As noted in the IS/ND, the proposed action would not have significant direct, indirect, or cumulative effects on the human environment. The proposed action would have the beneficial effect of improving soil and water quality by removing soil and groundwater contamination at the Berkeley Lab.

## Table 7.5-1. Summary of Probable Environmental Impacts[a]

**Direct Effects**

| NEPA Value | Summary of Impact Analysis for the Proposed Action |
|---|---|
| Aesthetics | Most actions would have no impact on the visual characteristics of Berkeley Lab. Those that would, such as excavations, would cause only temporary changes in the visual environment and would be visible only to on-site personnel or from a very few vantage points off site. Excavation sites would be returned to their previous condition (i.e., repaved) when work is complete. |
| Agricultural Resources | There are no agricultural resources on site or in the vicinity of Berkeley Lab and thus no impacts were identified for this NEPA value. |
| Air Quality | Corrective measures would not conflict with or obstruct implementation of any air quality plan (*e.g.*, the Ozone Attainment Plan, Clean Air Plan, or Carbon Monoxide Maintenance Plan). The actions would not violate any applicable air quality standard or contribute substantially to any existing or projected air quality violations. Applicable and appropriate BAAQMD measures would be implemented to reduce construction-period air impacts from excavation actions. The actions would create few or no toxic air contaminant emissions. |
| Biological Resources | Corrective measures would be conducted in areas of Berkeley Lab that are occupied by buildings, parking lots, and other infrastructure. In these areas, there are no natural vegetation associations, wildlife habitat, marshes, vernal pools, wetlands, or riparian areas. Hence, it is unlikely that listed or special status species would be affected by the corrective measures. |
| Cultural Resources | Corrective measures would not make changes to or remove historical buildings. The cleanup sites are located in previously disturbed areas of cut and fill that are not believed to contain paleontological or archaeological resources. |
| Environmental Justice | No specific low-income, minority or Native American population adjoins Berkeley Lab. Commuter and truck traffic will pass through or near minority/low income neighborhoods, but the impact due to CMS activity would be negligible. |
| Geology and Soils | Although Berkeley Lab is located in a seismically active region, implementing the corrective measures would not expose people or structures to substantial hazards from earthquakes. Excavations would be temporary and properly shored. Areas to be excavated are currently paved and would be repaved when excavation is complete. Most remediation facilities would be below ground (e.g., wells, trenches, piping) or relatively small (e.g., pumps, GAC canisters, drums) and thus not particularly susceptible to earthquake damage. None of the actions would occur in areas that are prone to landslides, liquefaction, tsunamis, or seiche waves. No structures would be constructed that would have foundations subject to deformation or damage by shrink/swell soils. |

**Direct Effects**

| NEPA Value | Summary of Impact Analysis for the Proposed Action |
|---|---|
| Hazards and Hazardous Materials | The corrective measures would not require bulk storage of flammable or combustible liquids or gases, corrosive, caustic, or otherwise reactive or toxic chemical substances. Any waste generated, such as spent GAC or contaminated soil, would be handled, stored and disposed of or recycled (GAC) in accordance with applicable DOE, local, state and federal laws, regulations and policies. Waste soil would be transported in covered bins and thus the possibility of a spill during transport would be small. |
| Hydrology and Water Quality | The corrective measures would remove contaminants from soil and groundwater, which would have the beneficial effect of improving water quality. No discharges of contaminated groundwater to surface water would occur. No streams or rivers would be altered. No new impervious surfaces or sources of pollutants would be created. The site is not subject to flooding and the measures would not increase the risk of flooding at downstream locations. |
| Land Use and Planning | The corrective measures would be implemented within the developed portion of Berkeley Lab near existing buildings and paved lots. The measures would not divide an existing community; conflict with existing or proposed land uses; convert open space; conflict with local general plans, zoning, or local adopted environmental plans and goals; or create a nuisance as a result of incompatible land use. |
| Mineral Resources | There are no mineral resources on site or in the vicinity of Berkeley Lab and thus no impacts were identified for this NEPA value. |
| Noise | Excavation, drilling, and trucking activities may temporarily increase noise levels nearby. However, they would not expose people off site to noise levels in excess of applicable local standards, including the City of Berkeley's Noise Ordinance, which specifies restrictions for construction activities |
| Population and Housing (Socioeconomics) | Workers needed to implement the corrective measures would be Berkeley Lab employees or local contractors, which would be a minor positive short-term socioeconomic impact. The small number of workers required to implement the proposed action would not create demand for new homes, employment, or infrastructure. No housing would be demolished by the proposed actions. |
| Public Services and Recreation | Berkeley Lab has on-site fire and security services, which can accommodate the proposed action. The corrective measures would not create increased demand for police or fire protection, schools, parks, or other public facilities in the surrounding communities because the action would not cause an increase in the local population. |
| Transportation and Traffic | Travel demand management procedures are incorporated as part of the proposed action. Truck traffic would be scheduled to avoid peak hours. With the incorporation of the traffic demand procedures, vehicle trips generated by implementation of the corrective measures (primarily truck trips during the excavation and removal of soil) would add very little to traffic congestion. Because the number of projected truck trips is small there would be only a very small increased probability of vehicle accidents. There would be very little effect on the demand for public transportation. |

| Direct Effects | |
|---|---|
| **NEPA Value** | **Summary of Impact Analysis for the Proposed Action** |
| Utilities and Service Systems | The corrective measures would extract contaminated groundwater, use GAC filters to remove VOCs, and then reinject clean water back into the ground to remove additional contaminants in a process known as soil flushing. Because groundwater is recycled in the process, no loss of groundwater would occur and the process would have the beneficial effect of removing contaminants. Some water would be discharged to the sanitary sewer under a permit issued by EBMUD. The volume and quality of water discharged to the sewer due to these corrective measures would alter negligibly the volume and quality currently discharged. If extracted and treated groundwater were no longer needed for recirculation, other reuse options would then be evaluated. Landfills in the area have adequate capacity to accommodate the approximately 1,400 cubic yards of waste soil that would be generated by the excavation of contaminated soil. Spent carbon from the GAC canisters would be collected and recycled off site. The proposed action would not impair stormwater quality or increase the volume of stormwater generated because no new impervious surfaces would be created. |
| **Cumulative Effects** | |
| Cumulative effects arise from the proposed action's incremental impacts, when added to the impacts of all existing and reasonably foreseeable future impacts. The Initial Study examined the potential for cumulative impacts. No issues arose from cumulative effects. | |
| **Indirect Effects** | |
| Indirect effects are reasonably foreseeable effects caused by the proposed action, but occur later in time or are further removed from the project site than direct effects. Growth inducement, which could have adverse effects due to increased traffic, reduced air quality, or loss of open space, is an example of an indirect effect. The corrective measures are not expected to produce adverse indirect effects. | |

[a] Source: DTSC 2005

Alternatives (i.e., alternative technologies) to the proposed action were summarized previously in this section and discussed in detail in Sections 3 and 4 of this CMS Report. These alternatives were compared using the formal RCRA evaluation process described in Section 4 and summarized at the beginning of this section. Some alternative technologies were rejected as ineffective or not applicable under site-specific conditions (e.g., phytoremediation and air sparging). Among the remaining potentially effective and applicable technologies, the cleanup alternatives that best met the evaluation criteria were selected for the proposed action while the remaining technologies (e.g., capping, slurry wall, sheet pile wall, soil mixing, and permeable reactive barrier) were rejected. In addition, the rejected technologies would have environmental effects similar to the proposed action because they would involve similar activities, such as excavation, operation of heavy

equipment, and hauling of soil and materials to and from the site. Thus, the rejected alternative technologies do not present an environmentally superior alternative to the proposed action.

In addition to the use of alternative technologies, one of the alternatives considered was a "No Action" Alternative. Under the No Action Alternative, the currently operating ICMs would be turned off and additional corrective measures would not be implemented. If the No Action Alternative were implemented, cleanup goals would not be achieved at some locations or it might take substantially longer to achieve the goals. If the goals are not achieved, institutional controls would be required to protect future workers and/or to designate groundwater as a non-drinking water source. This alternative would likely be unacceptable to regulatory agencies.

# SECTION 8

# REFERENCES


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